Patient Identification and Matching

National Committee on Vital and Health Statistics Subcommittee on Standards and Security

December 7, 2005

Slides are a summary of submitted written testimony

Overview

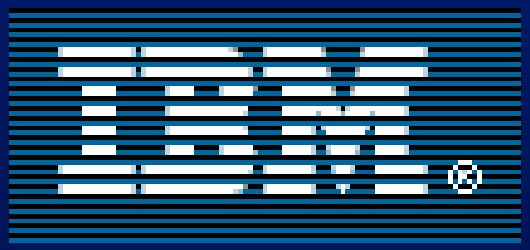
- Advanced Health Information Network Background
- AHIN System Architecture
- Patient Identification/Matching on AHIN
- AHIN Experience with Algorithms and Identifiers
- Summary and Conclusions

AHIN Founding Partners

ST. BERNARDS HEALTHCARE

CHRISTUS ST. MICHAEL Health System

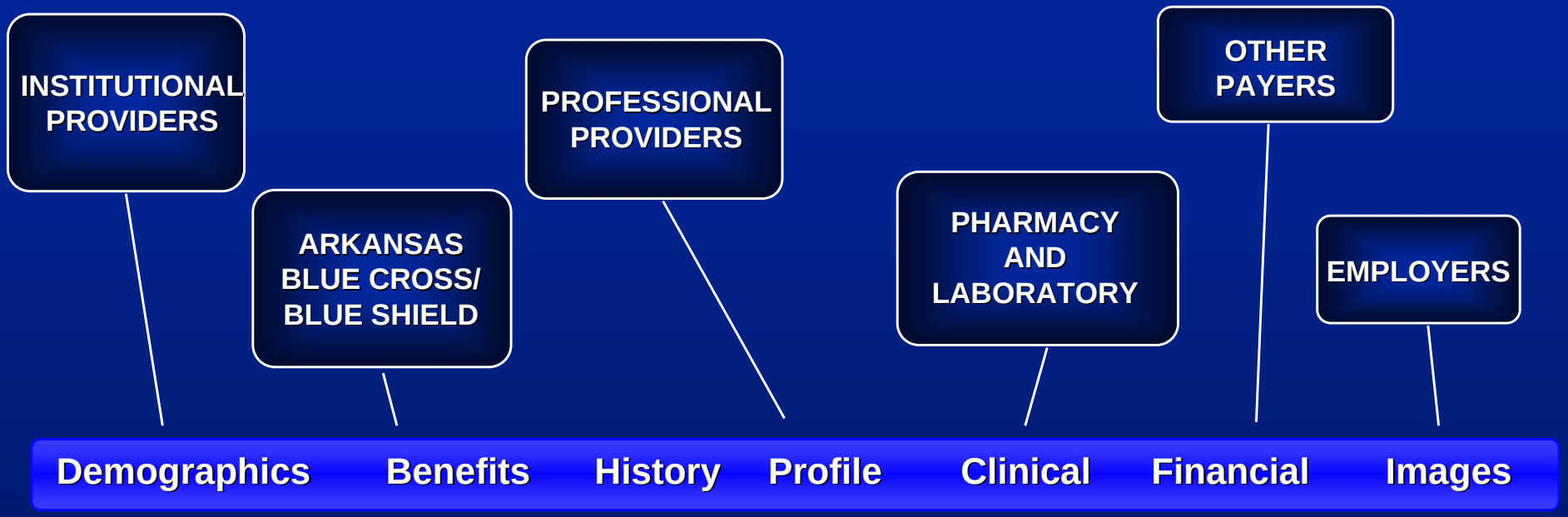
Arkansas BlueCross BlueShield
An Independent Licensee of the Blue Cross and Blue Shield Association



Architectural Guiding Principles

- The Patient/Member is the "Epicenter" of the architecture; all actions revolves around him/her
- Think globally of the HC Industry; not organizationally
- Leverage existing IT Investments wherever possible
- Provide "alternative options" for integration where possible
- Innovate through System Integration, where no organization has ever gone --- "Think outside the box"
- Create a "Virtual Secured View" of the Patient's/Member's Global record, via a Master Patient Index
- Build upon Industry Standards; ANSI and HL7
- Create Open systems, not burdened by only one tool or vendor
- While designed for Arkansas; architect for "portability to anywhere"

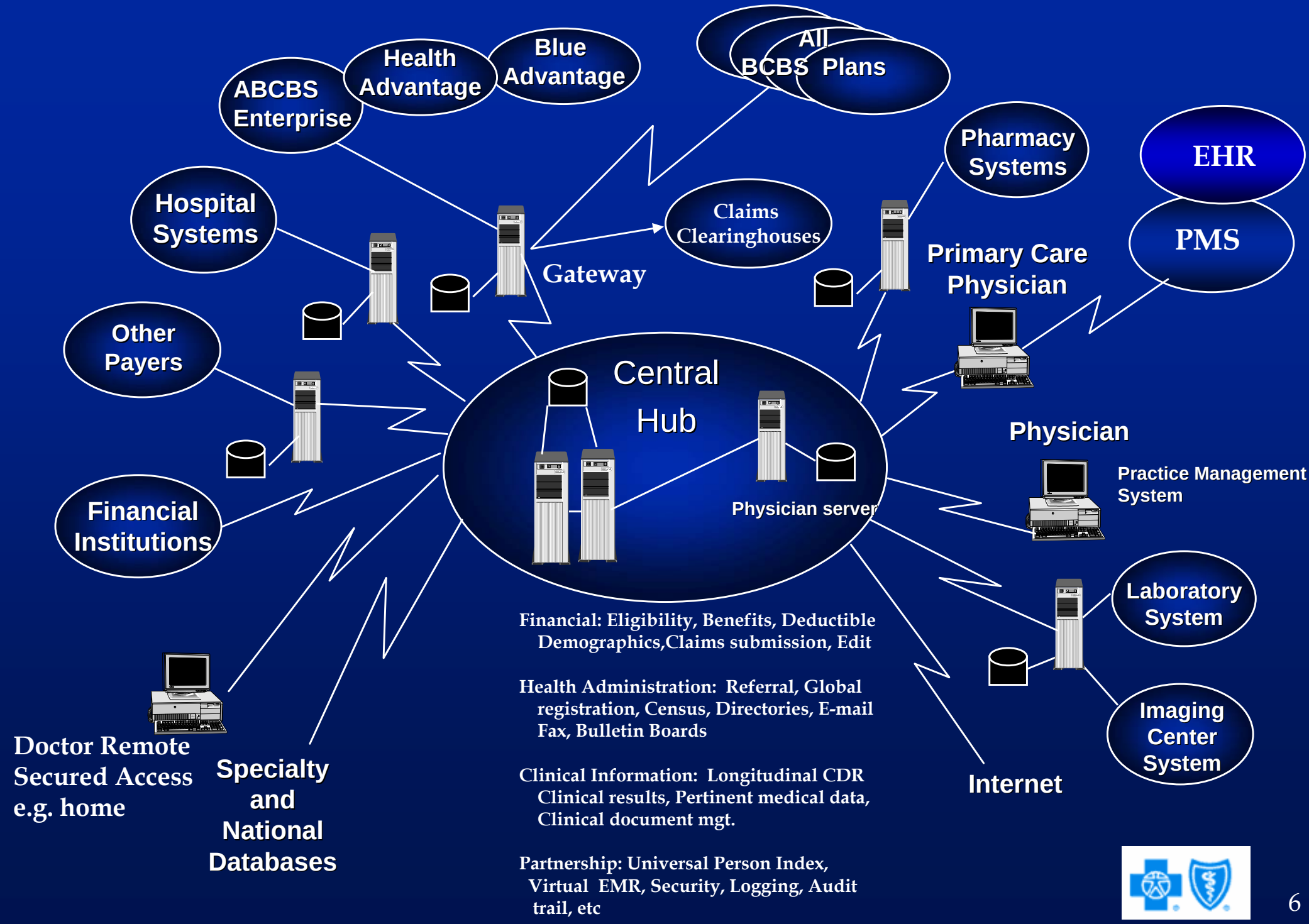
ARCHITECTURAL FOUNDATION



- **Global Member Data**

Demographics	Benefits	Medical History	Profile	Clinical	Financial	Images
• Address • Date of Birth • Soc Sec Num • Employer • Dependents • Other data	• Plan • Deductible • Copayment • Amount of deductible paid • Other Payer Liability • Other coverage data	• Summary data • Allergic reactions • Immunizations	• Genetic factors • Lifestyle characteristics • Stress index • Wellness index	• Laboratory results • Physician observations • Physician transcription • Treatment prescribed • Medications	• Claims • Claim status • Remittance	• Radiology • Ultrasound • MRI • Other

AHIN ARCHITECTURE

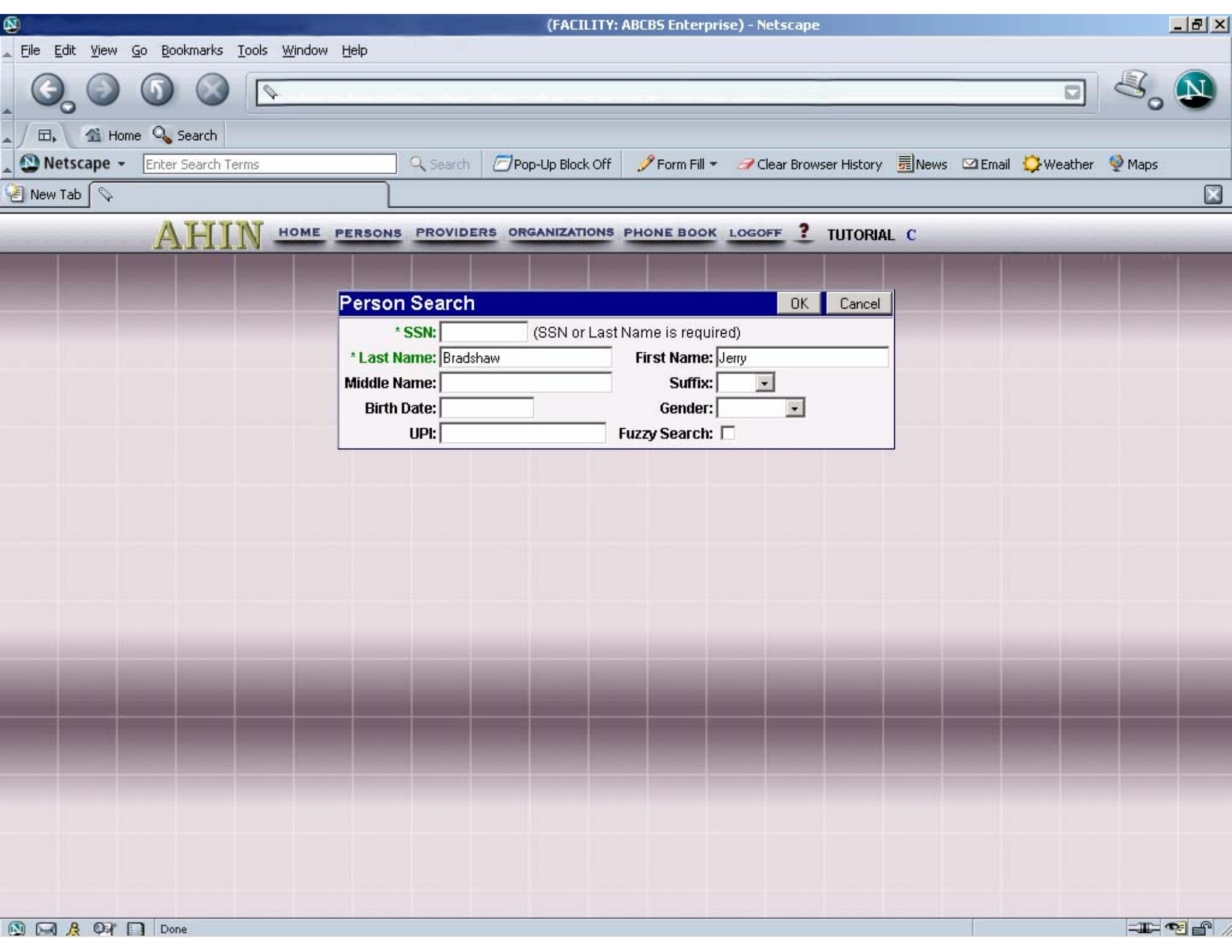


Financial: Eligibility, Benefits, Deductible Demographics,Claims submission, Edit

Health Administration: Referral, Global registration, Census, Directories, E-mail Fax, Bulletin Boards

Clinical Information: Longitudinal CDR Clinical results, Pertinent medical data, Clinical document mgt.

Partnership: Universal Person Index, Virtual EMR, Security, Logging, Audit trail, etc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HOME PERSONS PROVIDERS ORGANIZATIONS PHONE BOOK LOGOFF ? TUTORIAL C
Person Search
OK
Cancel
* SSN:
(SSN or Last Name is required)
* Last Name: Bradshaw
First Name: Jerry
Middle Name:
Suffix:
Birth Date:
Gender:
UPI:
Fuzzy Search:
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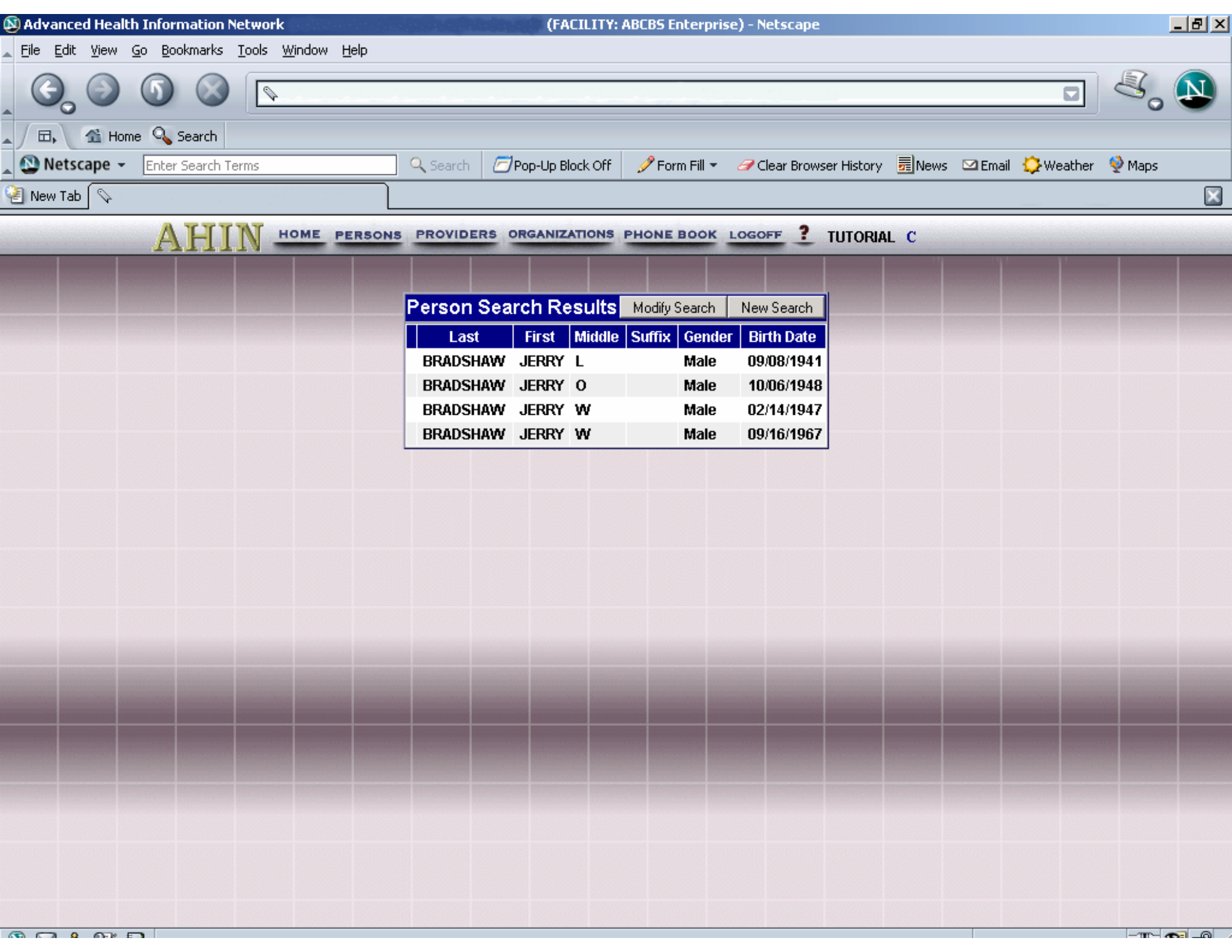
Advanced Health Information Network (FACILITY: ABCBS Enterprise) - Netscape
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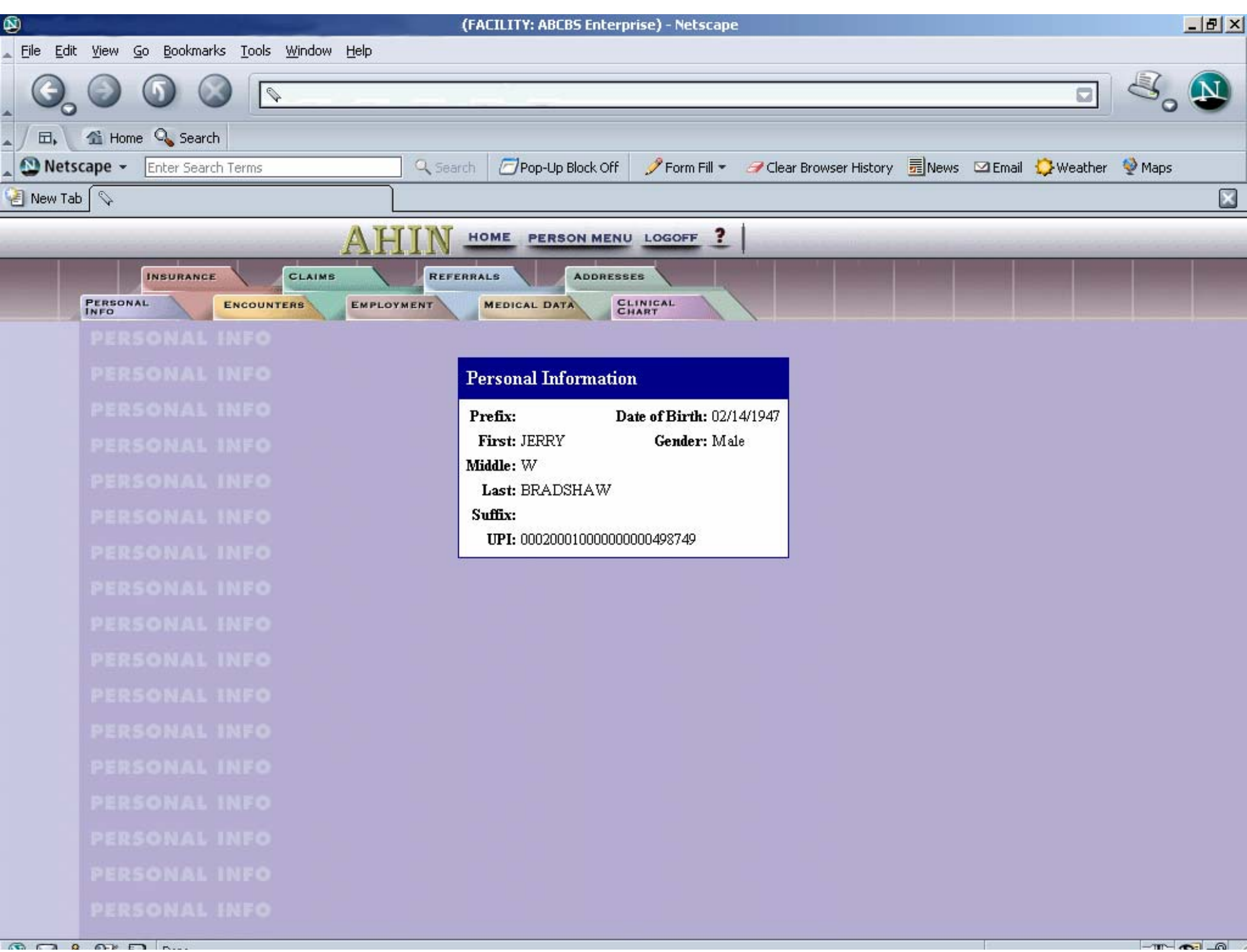
New Tab
AHIN
HOME PERSONS PROVIDERS ORGANIZATIONS PHONE BOOK LOGOFF ? TUTORIAL C
Person Search Results
Modify Search
New Search
Last First Middle Suffix Gender Birth Date
BRADSHAW JERRY L Male 09/08/1941
BRADSHAW JERRY O Male 10/06/1948
BRADSHAW JERRY W Male 02/14/1947
BRADSHAW JERRY W Male 09/16/1967


(FACILITY: ABCBS Enterprise) - Netscape
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New Tab
AHIN
HOME PERSON MENU LOGOFF ?
INSURANCE CLAIMS REFERRALS ADDRESSES
PERSONAL INFO ENCOUNTERS EMPLOYMENT MEDICAL DATA CLINICAL CHART
PERSONAL INFO
Personal Information
Prefix:
Date of Birth: 02/14/1947
First: JERRY
Gender: Male
Middle: W
Last: BRADSHAW
Suffix:
UPI: 00020001000000000498749

AHIN Security Profile

- **Private Network for Communication Between Servers**
  - > X.509 Certificate Authentication Between Servers
- **Initial User Access via VPN using IPSec Tunnel Protocol**
  - > Predominantly Secure Socket Layer (SSL) Now Due to Maintenance Advantage
- **Users Associated with Specific Organization via ID & PW**
  - > Access to all Confidential Data Except Eligibility Limited to Organization's Patients
  - > Ability to Certify Patient Authorization for Access to New Patient Clinical Data
  - > Emergency Providers Given "Break the Glass" Capability to View All Clinical Data
- **Registration Documents Changed to Allow Opt Out**
  - > Clinical Data Concerning Some Conditions Suppressed

AHIN's Current Deployment Profile

Deployment: Began in 1998

- Physicians: 8,195 -- nearly all
- Hospitals: 91 -- nearly all
- Other Providers: 344 -- major portion
- Deployed & Spun-off over 1,000 EHR Licenses

Operational Status

- Administrative Features: Fully Functional
- Clinical: Fully functional for 2+ years in 2 Regions;
  - reduced scope currently due to Provider funding issues
  - Interfaces from Hospital Lab, radiology & dictation systems to Physician's EHR (Logician) remains operational in 1 region

AHIN Patient Identification & Matching Data Flow

Data resulting from medical encounter is stored on a local server.

Local Server

A record of the patient encounter is forwarded to the Hub server.

AHIN Hub Server

A probabilistic algorithm is applied to each inbound record. Where a match is found, the existing UPI is associated with the record & stored in the MPI. If no match is found, a new UPI is created for the patient.

Identifiers	Match	Non-Match	Fuzzy Match
UPI	160	(40)	0
Last Name	50	(20)	0
First Name	20	(5)	5
Date of Birth	30	(10)	5
SSN	70	(30)	20
External ID	160	0	0

Threshold = 100

Probabilistic Algorithm Vulnerability

Ms. Jones is widowed, has lived in Maumelle, Arkansas for 10 years and has numerous records on the system.	Ms. Jones re-marries and moves to her new husbands home. After a year she sees a new physician who generates new records.
Last Name… Jones	Last Name… Smith
First Name... Linda	First Name... Linda
Sex……Female	Sex……Female
DOB……10/19/1948	DOB……10/19/1948
Zip Code….. 72113	Zip Code….. 71609

> The AHIN Database Contains Records on 1.5 Million Individuals
> Of the 1.5 Million Individuals, 12,000 Have Linda as a First Name
> Of the 12,000 Named Linda, 7 Have a DOB of 10/19/1948
> Likelihood is the New Record Won't be Matched

Summary and Conclusions

- **Matching Algorithms are Good but Vulnerable When Data Changes, e.g. Marriage, Divorce, etc.**
- **A Static Identifier Would be Very Useful in Many Cases, Especially When Data has Changed.**
- **A Static Key Value Improves Response Time.**
- **A National Patient Identifier Provides Advantages but is Long Term at Best Because of Implementation Issues.**
- **Probabilistic Algorithms for Patient Matching and Identification is likely the Most Viable Alternative Given the Urgency Associated with the NHIN.**